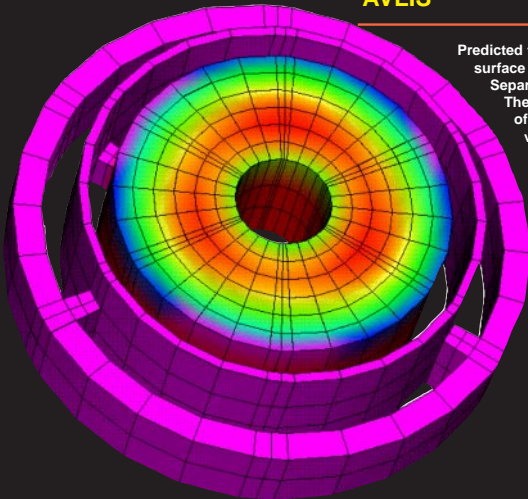# Thermal Fluids Group

The core business of the Thermal Fluids Group is to provide engineering design support to LLNL projects in the area of computational heat transfer and fluid dynamics. Additionally, we field experiments, perform code development, and collaborate with industry and universities on research projects.

AVLIS

Predicted temperature profile on the emitting surface of the Atomic Vapor Laser Isotope Separation (AVLIS) electron-gun emitter. The emitter produces an intense beam of high energy electrons which vaporize uranium during the AVLIS-enrichment process.

NIF amplifier thermal recovery analysis
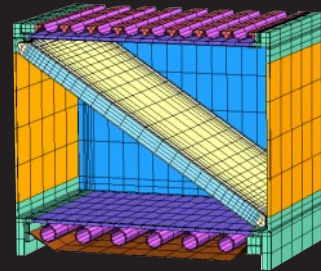
This model of a National Ignition Facility (NIF) laser beam amplifier module was used to predict the cool-down response after a shot. Shown are temperature profiles.

NIF Target Chamber
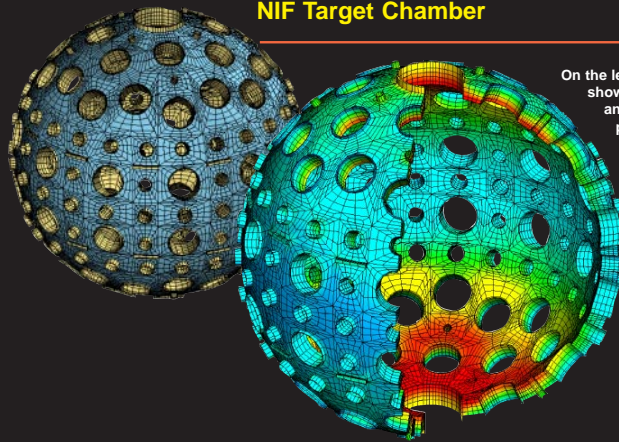
On the left, the finite element model shows laser beam entry locations and diagnostic instrumentation ports. The cutaway on the right shows the temperatures in the target chamber after a shot.

TOPAZ3D Model for APT Project
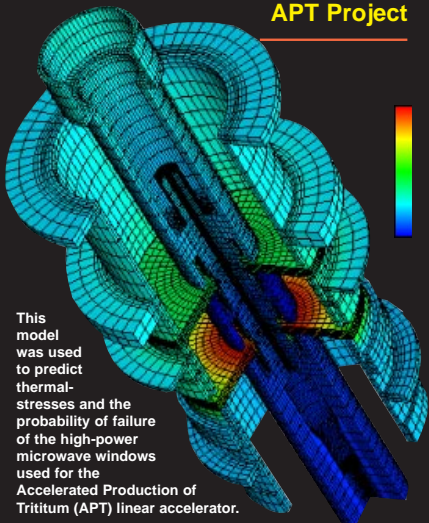
This model was used to predict thermal-stresses and the probability of failure of the high-power microwave windows used for the Accelerated Production of Tritium (APT) linear accelerator.

Droplet-Based Manufacturing
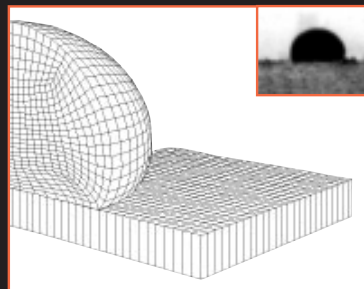
LLNL is collaborating with UC Irvine to develop a code to investigate droplet-based net-form manufacturing process parameters. On the left is a numerical prediction of the deformation. The inset is a photograph of a solder droplet impacting a rigid substrate.